

at least once in every six years, which is open to the whole world. The only express condition is that the award is to be for discoveries of real importance in the domain of pure mathematics.

It is intended that the director of the institute should be an eminent, and at the same time sympathetic, mathematician. The library will be available for all serious students, and they will have the privilege of consulting the director. Part of his duties will consist in giving courses of lectures to a limited number of "really gifted auditors, keenly interested in his discourses." Prof. Mittag-Leffler states that, in making his arrangements, he has taken as his model the Pasteur Institute; and the final clause of this enlightened and far-seeing document is as follows:—

Our will owes its origin to the lively conviction that a people which does not hold Mathematics in high esteem will never be able to fulfil the loftiest duties of civilisation; and that consequently it will fail to enjoy that international consideration which, in the long run, forms an effective means of preserving our status in the world, and of maintaining our right to live our individual life.¹

We have only to add that in our opinion this is a noble example of well-directed patriotism and philanthropy which ought to lead to many imitations.

NOTES.

WE learn with much regret that Prince Boris Galitzin, professor of physics in the Imperial Academy of Sciences, Petrograd, and a distinguished worker in seismology, died on April 21/May 4.

WE notice with deep regret the announcement of the death on June 30, at seventy years of age, of Sir Gaston Maspero, the well-known Egyptologist and permanent secretary of the Académie des Inscriptions et Belles-Lettres, Paris.

THE twenty-seventh annual meeting of the Museums Association will be held at Ipswich on Tuesday and Wednesday, July 11 and 12, under the presidency of Mr. E. Rimbault Dibdin, Curator of the Walker Art Gallery, Liverpool.

THE annual general meeting of the Eugenics Education Society will be held at the Grafton Galleries, London, W., to-day (July 6), at 4 p.m., when the presidential address will be delivered by Mr. Leonard Darwin.

A SPECIAL Prize Fellowship of 100*l.*, offered by the Federation of University Women to encourage research on some questions of special interest in the present national crisis, has been awarded by the Federation to Dr. Alice Lee, Fellow of University College, London. Miss Lee has collaborated for some years with Dr. Karl Pearson in many statistical investigations, and is also the author of several independent communications. She is about to undertake an investigation into the birth-rate as affected by present conditions.

In the *Times* of July 3 its special correspondent, in describing the battle on the Somme, refers to the

¹ "Notre testament doit son origine à la vivante conviction qu'un peuple qui n'accorde pas aux Mathématiques un rang élevé dans son estime, ne sera jamais en état de remplir les plus hautes tâches civilisatrices et de jouir, par suite, de la considération internationale qui, elle aussi, constitue la longue un moyen efficace de conserver notre situation dans le monde et de sauvegarder notre droit à vivre notre propre vie."

occasional inaudibility of the gun-firing at short distances. "Last night" (June 29), he says, "I watched the bombardment from a position commanding a view of a large section of the front. . . . It was a soft dark night, with a light westerly wind. . . . The comparative noiselessness of the bombardment from near at hand last night was very curious." On the hilltop where he stood he was unable to hear "any sound save of the guns immediately by us, with occasional bursts of sound coming quite illogically from far away. And all the while the flare and flashing of the shells was continuous."

WE regret to announce that M. Emile Waxweiler, who before the war was the director of the Solvay Institute of Sociology at Brussels University, was killed in London on June 26 by a motor-car. An appreciative account of M. Waxweiler's work, in the *Times* of June 29, points out that the sociological studies produced by him and under his direction were models of scientific inquiry. Among his best-known works before the war are his "High Wages in the United States" and "Profit Sharing." He was recently appointed director of the Belgian Office of Economic Studies, established in London to ascertain the needs of Belgian trade and industry; and he was also chosen as a delegate to the recent Economic Conference at Paris, where he was the right hand of the Belgian Premier, M. de Broqueville.

A DEPUTATION from the Royal Scottish Arboricultural Society met a number of Scottish members at the House of Commons on July 4 and laid before them the case for the creation of a Department of Forestry connected with the Board of Agriculture, for the development of forestry in Scotland, and the preparation of schemes of afforestation. In connection with this subject the Parliamentary correspondent of the *Times* states that the Government has decided to conduct an inquiry into the subject of afforestation after the war. The inquiry has been entrusted to a sub-committee of the Reconstruction Committee of the Cabinet.

THE failure of the Uruguayan trawler *Instituto Pesca* to reach Sir Ernest Shackleton's men on Elephant Island was not surprising in view of the fact that she is an unprotected vessel and made the attempt in the Antarctic midwinter. The Uruguayan Government, however, has ordered her to lie at Punta Arenas awaiting a more favourable opportunity. Meanwhile the damage she sustained in the ice is being repaired. Open water up to Elephant Island is quite possible in any month of the year, but it can never be relied on, and so the chances of the *Instituto Pesca* succeeding are most problematical. The Argentine sloop *Uruguay*, which rescued the wrecked Swedish expedition in 1903, is unfit for service. But it is reported that the Chilean Government has a wooden whaler, which has been offered to Sir Ernest Shackleton. If she is in good repair, this vessel should be able to reach the marooned men, for even if heavy pack is encountered a strong wooden ship could either force a passage or lie and wait for the pack to slacken. This appears to be the only possible ship in South American waters. A suitable ship could be secured in this country, but, at the earliest, could not reach Elephant Island before the end of August. If, however, Sir Ernest Shackleton reports that the shipping resources of South America cannot meet the demand, a vessel will be sent from home.

THE Manchester City Council (governing body of the Manchester School of Technology) has just decided to establish forthwith a new sub-department of the school for post-graduate study and research in coal-

tar products and dyestuffs, and has appointed Prof. A. G. Green, F.R.S., to take charge of it. Prof. Green recently resigned the chair of tinctorial chemistry at Leeds University in order to direct the research department of the largest Lancashire firm of dyestuff manufacturers. His sub-department will be under the general direction of Prof. Knecht, who is head of the department of applied chemistry, and is expert in the use of dyestuffs, as Prof. Green is expert in their manufacture. With two such distinguished chemists in command, the Manchester School of Technology should be able to render invaluable assistance to producers and users of dyes, and so to assist materially in the development of this specially important branch of British chemical industry.

PROF. PAUL JANET, of the Sorbonne, gives in the *Revue générale des Sciences* a short account of the work of the late Prof. Eric Gerard, of the Montefiore Electrotechnical Institute, Liège. He was born in Liège on September 22, 1856, and, after graduating as an engineer at the University there in 1878, completed his studies at Paris. In 1881 he returned to Liège as professor of applied electricity at the School of Mines, and two years later was made director of the newly founded Montefiore Institute. His great abilities, both as an administrator and as a teacher, rapidly raised the institute to the prominent position it has occupied for so many years, and his "Leçons sur l'Electricité," which appeared in 1890, was recognised as a masterpiece throughout the electrotechnical world. He represented Belgium on all international electrical commissions, and his opinions had great weight with his colleagues. When Liège was attacked by the Germans in 1914 he was recuperating after the term's work at his country house, sixteen miles south-east of Liège, and only with difficulty got away to Holland. Early this year he came to England, but on his health giving way he returned to Paris, and died there on March 28 without having seen his own country.

At the meeting of the Royal Society of Edinburgh held on July 3 the following Honorary Fellows were elected:—*British Honorary Fellows*:—Sir Francis Darwin, Cambridge; Dr. J. W. L. Glaisher, Trinity College, Cambridge; Prof. J. N. Langley, professor of physiology, Cambridge; Prof. C. Lapworth, emeritus professor of geology, University of Birmingham; Prof. A. Macalister, professor of anatomy, Cambridge; Prof. A. Schuster, emeritus professor of physics, University of Manchester. *Foreign Honorary Fellows*:—Prof. C. Barrois, professor of geology and mineralogy, Lille; Prof. D. H. Campbell, professor of botany, Leland Stanford University, Cal., U.S.A.; Prof. M. E. Gley, professor of physiology, Paris; Prof. C. Golgi, professor of anatomy, Rome; General W. C. Gorgas, U.S. Army Medical Department; Prof. G. B. Grassi, professor of comparative anatomy, Rome; Prof. E. C. Pickering, professor of astronomy, Cambridge, U.S.A.; Prof. E. Warming, emeritus professor of botany and keeper of the Royal Botanic Gardens, Copenhagen. The following prizes of the society were presented:—The Keith Prize Award for the biennial period 1913-1915 to Dr. J. H. Ashworth for his papers on "Larvæ of *Lingula* and *Pelagodiscus*" and on "Sclerocheilus," published in the Transactions of the Society, and for other papers on the morphology and histology of *Polychæta*; and the Neill Prize Award for the biennial period 1913-1915 to Dr. R. Campbell for his paper on "The Upper Cambrian Rocks at Craigvean Bay, Stonehaven," and "Downtonian and Old Red Sandstone Rocks of Kincardineshire," published in the Transactions of the Society.

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THE Albert Medal of the Royal Society of Arts for the current year has been awarded to Prof. Elias Metchnikoff, For.Mem.R.S., "in recognition of the value of his investigations into the causes of immunity in infective diseases, which have led to important changes in medical practice, and to the establishment of principles certain to have a most beneficial influence on the improvement of public health." The annual report of the council, published in the Journal of the Society for June 30, refers to the award as follows: "The discoveries of Prof. Metchnikoff in regard to the nature of immunity to infective diseases have contributed, more than the work of any other living man, to the control of such diseases, and to the consequent improvement in the health of great European populations, and the safeguarding of those who have to face the dangers of bacterial infection, whether on the battlefield or as pioneers in tropical climates. For many years, as professor of zoology at Odessa, he was an ardent student of lower forms of life. It was by the study with the microscope of the cell activities of sponges and transparent marine organisms that he arrived at his discovery of phagocytosis. These researches into the development and metamorphoses of invertebrates prepared the way for his great discovery, as he was led by the observation of the action of the mesoderm cells in the embryonic organs of echinoderms to the knowledge that the white blood-cells or phagocytes devour the invading microbes in vertebrates also, and he was thus able to show the universal applicability of his generalisation. Prof. Metchnikoff's services to zoology and pathology are of world-wide repute, and have already been recognised by the award of the Nobel Prize for Medicine, and of the Copley Medal of the Royal Society."

Two methods of mounting fossil vertebrates are described in the *Museums Journal* for June. One of these includes the skeleton of *Stenomylus*, a diminutive relation of the camel. This has been recently mounted in the British Museum of Natural History in a standing posture, and partly embedded in plaster. The other is that of the skeleton of an extinct reptile, *Thescelosaurus neglectus*, which is exhibited in the United States National Museum "almost in the position in which the bones were found." It is not clear, from the description here given, whether the term "almost" refers merely to slight restoration or implies a remounting, as in the original matrix. In the latter case the method has nothing to commend it, but rather the reverse.

THE annual report of the Zoological Society of Scotland appears this year in a slightly abbreviated form, owing to the falling off of income incidental to the war. It is devoutly to be hoped that the society has weathered the worst of the storm, for the newly established Zoological Park bids fair to excel even its rival in London, at least in so far as sumptuousness in the housing of the animals is concerned. In this, of course, the natural advantages of the site play an important part. Diminishing funds have made strict economy an urgent necessity, but it is to be hoped that no further curtailments will be needed. The Carnegie Trustees have generously promised the sum of 10,000*l.* for the purpose of building and equipping an aquarium in the park, but it is not the intention of the council to proceed with the work until after the war.

THE report of the director of the Aquarium of the Zoological Society of New York, which has just reached us, has some interesting comments on the use of metal tanks for the transport of live fish.

Finding that the galvanised tanks commonly used suffered much from the rough handling to which they were subjected on shipboard, wooden tanks were substituted. These have a capacity of 156 gallons, and have proved in every way preferable. A great saving both of labour and expense has been effected by feeding the fish on alternate days instead of every day. The mortality has also decreased, an excess of fat having resulted from a too liberal diet. Altogether more than 3000 fishes, representing 140 species, are exhibited here, and among these are an unusually fine series of tropical species, and "jew-fishes" up to 500 lb. in weight. The porpoises died during the year from water fouled by sewage; to avoid losses from this source filtering tanks have been established, with eminently satisfactory results.

In *Californian Fish and Game*, the journal published by the Board of Fish and Game Commissioners of San Francisco, vol. ii., No. 2, Mr. Chase Littlejohn gives a brief but valuable account of the habits and hunting of the sea-otter, which is fast nearing extinction. As the author was himself for some years engaged in hunting this animal, his summary makes an important addition to our knowledge of its life-history. Unlike all other aquatic mammals, the sea-otter, he tells us, swims on its back, turning swiftly over when about to dive, but he affords no information as to the part played by the tail while swimming at the surface. Sea-urchins appear to be the staple food of this animal, and these are brought to the surface and eaten as the swimmer floats upon his back. Squids and seaweed are also eaten, and occasionally fish. After man, the greatest enemy of the sea-otter is the killer-whale, from which it contrives, at times, to escape by floating at the surface as if dead. In the early days of the author's hunting, sea-otters were met with off the coasts of Japan in "schools" of as many as 400, but owing to the merciless persecution to which they have been subjected hunting is now no longer a profitable undertaking and has been abandoned.

British Birds for June contains the first of what promises to be a valuable series of records on the breeding habits of the sparrow-hawk. In the present contribution the author, Mr. J. H. Owen, describes the behaviour of the adults towards the young during rain. Ordinarily, after the young are a few days old, the hen does not require her mate to bring food to the nest. In rain, and especially in heavy rain, this is not so. She takes no notice of his calls, and he has to bring the food and deposit it on the nest. If the rain is not very heavy she will then break it up and distribute it, but in a heavy downpour she will wait until its violence has ceased rather than expose her offspring to the danger of a soaking. During pelting rain the hen, hurrying home at the first sign of the impending storm, stands over her young with outspread wings, taking especial care to cover her youngest completely. When the storm ceases she will take up her position on some neighbouring tree and expose her sodden plumage to the sun and air. The down of the nestlings seems never to get thoroughly soaked, and no attempt is made to preen it until some time after the hen has left them. This account is illustrated by some excellent photographs.

In the *Journal of the Royal Horticultural Society* (vol. xli., part 3, for May) Mr. C. H. Senn contributes a useful paper on leaf vegetables and how to cook them. Vegetables are essential to both good eating and good health, so that their proper preparation and cooking are matters of the first importance. Compared with other articles of diet—fish, meat, and poultry—

vegetables when properly cooked can be converted into correctly balanced food at about one-third the cost. The importance of paying attention to such matters is therefore essential, especially at the present time.

THE importance of the Canary Island palm, *Phoenix canariensis*, is referred to in Kew Bulletin No. 4. Dr. G. V. Perez states that it is the best wind-break for plantations and also that it is an ideal tree to plant along river-banks to prevent soil erosion. In addition, the hard kernels are found in the Canaries to be one of the best and most fattening foods for pigs, and they are also relished by goats. Dr. Perez mentions that he is feeding a milch-cow on the kernels after steeping them for a few days in water, and has found them useful for fattening turkeys. Palm honey can be obtained from the trees by tapping. The practice of tapping the palms was probably introduced from the opposite coast of Africa by the aborigines of the islands.

IN vol. lxxvi. of the *Journal of the Royal Agricultural Society*, recently issued, Dr. Winifred Brenchley describes the weeds on arable land and the best means for their suppression. Surveys of considerable areas of agricultural England have shown that comparatively few weeds are definitely associated with a single type of soil. Some of the most noxious weeds, from the farmer's point of view, are quite indifferent to soil variations; others, although of general distribution, are more frequently found on certain soils; while a small number are characteristic of particular soils, more especially sand and chalk. The methods of suppression applicable to annual and perennial weeds are dealt with generally, special treatments being prescribed for the most noxious species. Thus charlock (*Brassica arvensis*) is very susceptible to sprays of copper and iron sulphates, which do no harm to cereals growing in the same field, as their long, narrow leaves do not hold the poisons like the rough leaves of the weed. In this connection it may be noted that arsenical sprays have been used successfully abroad for weed eradication on a large scale. Sometimes a weed becomes so firmly established that ordinary methods are useless, and fallowing or a change in the rotation must be tried. As a rule, thorough cultivation of the soil at the right times—and it is here that Dr. Brenchley's paper will greatly help the farmer—is all that is required.

SOME notes on the meteorological observations of Roald Amundsen's Antarctic expedition of 1911-12 appear in *Naturen*, a monthly publication of the Bergen Museum, for March and April, 1916 (vol. xl., Nos. 3 and 4). The paper is by H. Mohn, who was responsible for the volume on meteorology in the scientific publications of the expedition. Prof. Mohn points out that the observations support the idea, advocated by Prof. Meinardus, that there is a cyclonic movement of air over the Antarctic plateau. The winds seem to have a comparatively high temperature and the characteristics of cyclonic winds. The pressure observations showed a decrease towards the Pole. The existence of cyclonic conditions over the continent would account for the heavy snowfall that must have been required for the formation of the ice-cap. On the other hand, it must be remembered that there are evidences that the snowfall in Antarctica is less than it was and insufficient to account for the formation of the ice. Certainly it is not proved that the inferior snowfall on the plateau is heavy, and it must not be forgotten that we have no winter observations, except on the coast.

AFTER many vicissitudes and much conflict of opinion, a water-supply scheme for Aberdeen has been definitely laid down, and although some time will necessarily elapse before the undertaking can be carried out in its entirety and the town enjoy the full advantages of the additional supply, it is recognised on all sides that the settlement of the vexed question is a matter for congratulation. The present supply is drawn from the Dee, and, despite strong advocacy of the merits of the Avon and the Dye, the future supply will continue to be drawn from the same source, though from a point some distance further upstream. The new intake will be at Cairnton, on the left bank of the river, twenty miles above Aberdeen. One of the principal objections raised against the Dee scheme was that, before interception, the stream passes through several populous districts, such as Braemar, Balmoral, and Ballater, which must inevitably cause some degree of pollution. On the other hand, the wide, shallow, and pebbly bed of the river lends itself admirably to the oxidation of its waters. It has been felt preferable not to rely merely on filtration and storage, but to bring about further purification by the excess lime treatment. A section of this work has already been installed, and is described, with illustrations, in the *Engineer* of June 23. The population to be supplied with water numbers 170,000, and the average daily consumption per head is computed at 40 gallons. The new scheme, as a first instalment, will provide $8\frac{1}{2}$ million gallons per day, and afterwards an additional $1\frac{1}{2}$ million gallons per day.

OUR ASTRONOMICAL COLUMN.

A JUNE METEORIC DISPLAY.—Mr. W. F. Denning writes from Bristol:—"On the evening of June 28, after a cloudy, oppressive day, the atmosphere cleared. On going out into my garden to commence observations at about 10.25 G.M.T., I almost immediately saw that a very rich and unexpected display of meteors was in progress.

"Continuing to watch until 12.15, I saw fifty-five meteors, including many fine ones. Then clouds interrupted, but these had drifted away and left the sky clear again at 12.45, and fourteen additional meteors were seen in half an hour.

"The radiant was at $230^{\circ}+54^{\circ}$, and there seemed to be a well-marked companion centre near β Boötis at $223^{\circ}+41^{\circ}$. The meteors were slow, and all the brighter ones left evanescent trains of sparks. The shower seems quite unknown, but there are rich radiants in Quadrans on January 2 and October 2."

THE VISIBILITY OF STARS IN DAYLIGHT.—Among other interesting items, a note in the *Observatory* (June) records that Sirius was seen with the naked eye by Mr. A. E. M. Fleming one minute before sunset on April 18. It may be stated here that M. Bigourdan has now obtained grounds for believing that the observation referred to in NATURE, June 15, should really be ascribed to Peiresc (*Comptes rendus*, No. 24).

THE LARGE METEORITE OF FEBRUARY 13, 1915.—This object fell in the Chusan Archipelago, near Video, and an interesting description of the facts attending its fall, by Mr. W. F. Tyler, appears in the *Journal of the Royal Asiatic Society* (vol. xlv., 1915). Mr. Tyler alludes to many of the observations and discusses the real path, but the data were somewhat conflicting, and he found it impossible to harmonise them and derive a perfectly trustworthy result. He concludes that the meteorite probably exhibited a curved flight, being directed from N.N.E. at first and

from N.W. towards the end. As to the actual dimensions of the meteor, Mr. Tyler concludes that the incandescent mass at one point of its path was 1500 ft. in diameter, while at the end it had declined to 80 ft.

Mr. Tyler has done the best he could with discordant materials, but it is far easier to assume that the obviously rough observations were wrong than that the meteor had a very devious course. The writer would prefer to adopt a straight course of about 60 geographical miles from N. by W.

As to the diameter, the actual nucleus was probably not more than two or three feet in diameter. It is well known that meteoric bodies when incandescent appear enormously larger than they really are. Thus the meteorite which fell near Wigan on October 13, 1914, gave a brilliant illumination and thunder-like reports over a wide area, though it only weighed 33 lb. when afterwards discovered.

THE MOTION OF THE NUCLEI OF COMET 1915E (TAYLOR).—In a series of measures of the nuclei of Taylor's comet, made at Bergedorf by H. Thiele between February 19 and April 3, the distance showed little change, but the position angle varied considerably. The observation gave a period of about thirty days. If this is considered to be a rotational motion the total mass of the comet would be about 10^{-10} (*Astronomische Nachrichten*, No. 4846).

ON CENTRE—LIMB SHIFTS OF SOLAR WAVE-LENGTHS.—An important memoir dealing with this subject, by Mr. J. Evershed and Dr. T. Royds, appears as Bulletin No. xlix. of the Kodaikanal Observatory. The alterations of wave-lengths of certain iron lines have been studied in greater detail over the sun's disc, and it appears that they begin to be measurable not far from the centre (0.3 of the radius). Thus the displacements cannot be due to differential pressure effects. The inverse relation between the limb shift and centre shift is held to indicate that they have a common origin. The authors prefer to seek the cause in line-of-sight motion rather than in anomalous dispersion, although recognising the possibility of basing thereon an attractive explanation. The Doppler effects would result if there exists a general motion directed away from the earth all over the disc. A crucial test of the hypothesis, it is suggested, would be afforded by measures of lines in the spectrum of that face of the sun reflected from the planet Venus.

METALLOGRAPHIC METHODS IN AMERICA.

IN a paper on "A Metallographic Description of Some Ancient Peruvian Bronzes from Machu Picchu," Mr. C. H. Matthewson, in the *American Journal of Science* (No. 240, December, 1915), gives an interesting account of the detailed application of modern metallographic methods to the study of ancient metal objects with the view of arriving at an insight into the methods of working employed by those who fashioned the various objects. Some work of this kind has already been done by Garland, Hadfield, and Rosenhain, but the present paper carries the matter further, for the author has carried out a somewhat extensive series of experiments on the behaviour of the tin-copper alloys under cold and hot working and annealing, in order to arrive as closely as possible at the precise mode of treatment which each of the thirty-three objects examined had undergone. While in general terms it has always been possible to determine from a microscopic examination of such an object whether it has been cast or wrought, Matthewson endeavours to carry the matter further and to